ROAD TO **EXPO 2020**

AGRITECH OPPORTUNITIES IN THE UNITED ARAB EMIRATES

NEW ZEALAND
TRADE & ENTERPRISE
Te Taurapa Tūhono

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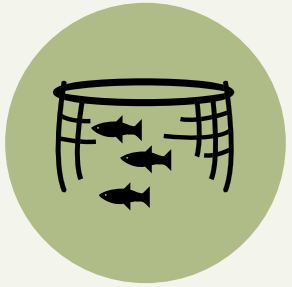
EXECUTIVE SUMMARY

THE OPPORTUNITY FOR NEW ZEALAND COMPANIES IS A USD 51 MILLION AGRITECH MARKET FORECAST TO GROW AT 15.7% CAGR

UAE's agriculture has traditionally been constrained by its challenging agroclimatic conditions.

Renewed focus on food security and a goal to be most food secure nation in the world has spurned funding and expansion of agriculture production.

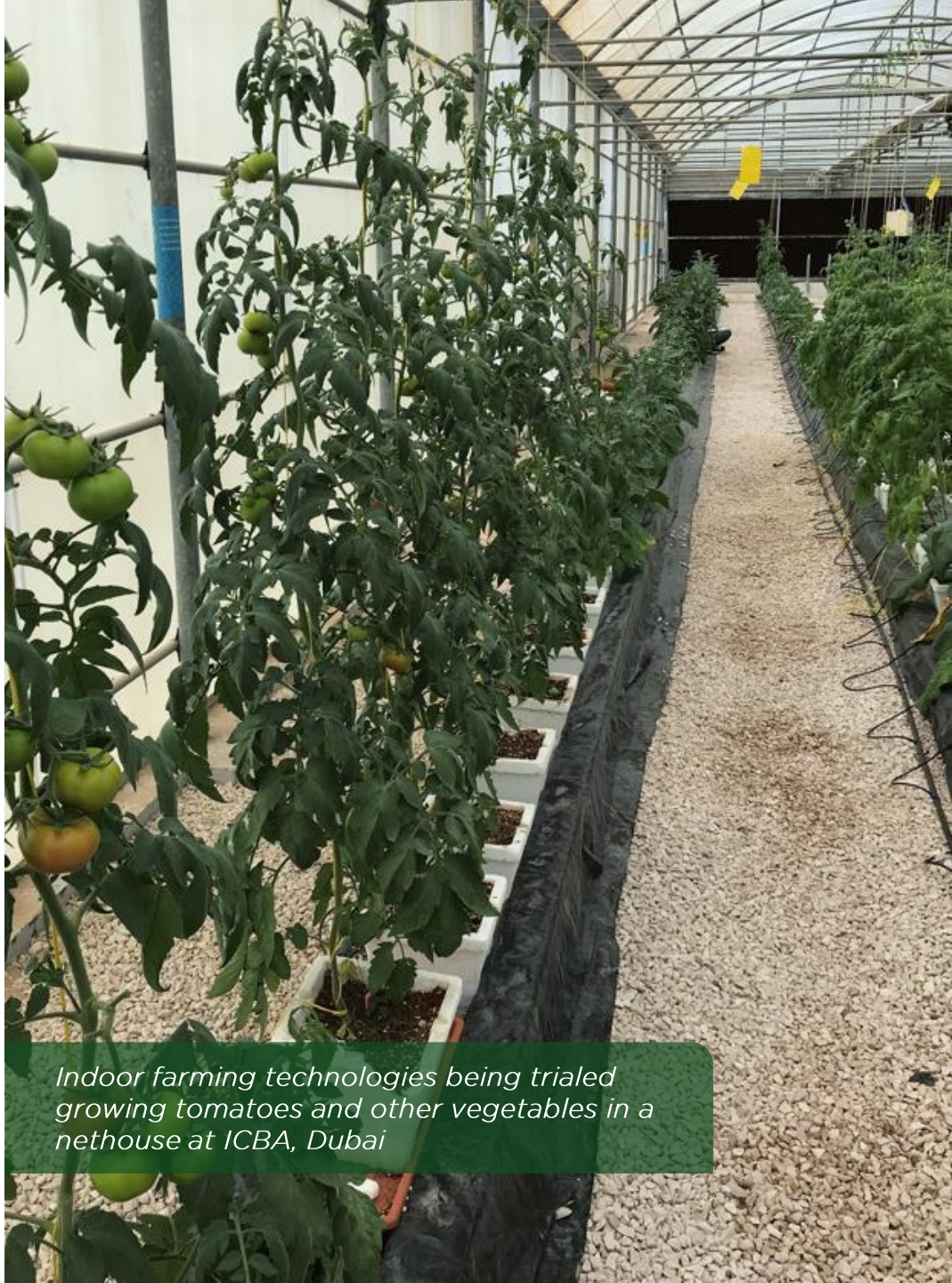
Agritech innovations offer opportunities to overcome environmental challenges.



New investment moving toward Climate Controlled Agriculture, and Intensive Aquaculture.

KEY TRENDS

- Despite increased production food, imports continue to rise.
- Horticultural production is diversifying in response to changing consumer preferences and technological adaptions.
- Reduction in open field crop production due to sustainability concerns.
- UAE Government actively incentivizing new investment into agritech focus areas.
- Increase in controlled environment agriculture systems for vegetable and fruit production.
- Aquaculture production targeted as major investment area.

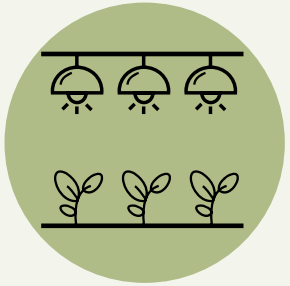


Indoor farming technologies being trialed growing tomatoes and other vegetables in a nethouse at ICBA, Dubai

EMERGING OPPORTUNITIES

Plant and Animal Genetics
- Heat and drought resistant plants
- High yielding crops
- Heat tolerant livestock

High Efficiency Irrigation
- Variable rate applicators
- Localized monitoring
- Irrigation mapping software



Controlled Environment Agriculture
- Nutrient sensors and applicators
- Energy efficient lighting
- Energy efficient cooling

Intelligent Crop Monitoring
- Drones and machine vision
- Crop management software
- Farm layout mapping

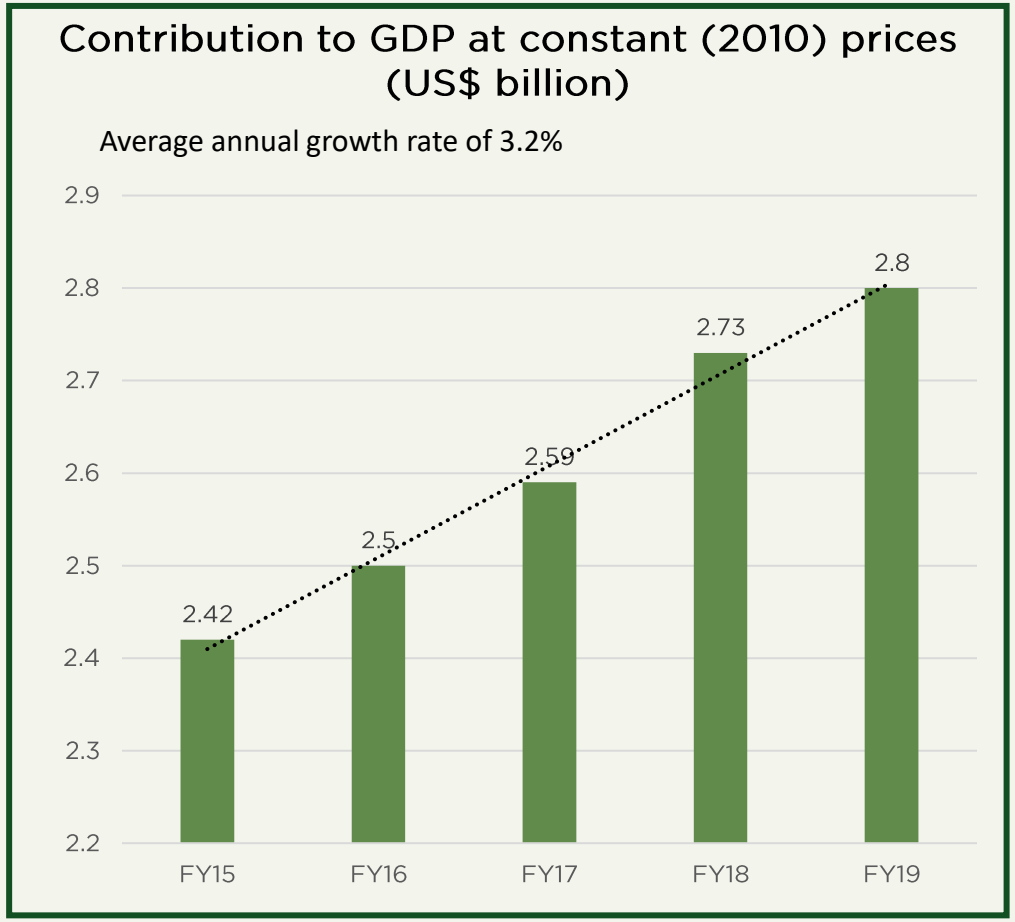
Aquaculture
- Climatic sensors
- Cost effective and efficient feeding solutions
- Data management applications

Automation
- Sowing, management & harvesting
- Harvesting
- Individual animal management

OVERVIEW OF AGRICULTURE IN THE UNITED ARAB EMIRATES

WHAT AGRICULTURE MEANS TO THE UNITED ARAB EMIRATES ECONOMY

- The UAE is located in an arid zone, where desert environment accounts for more than three quarters of the country's total area.
- Fertile land is at a premium and is high-risk for overuse and nutrient depletion.
- To irrigate crops, the country is dependent on costly desalination. **Of what water the UAE does produce – 66% of it is used for agricultural purposes.**
- The government has prioritized agricultural production in an effort to contribute to food diversity and food security for its citizens and residents.
- Due to the support of innovative new technologies, agriculture is a strong contributor to UAE economy.



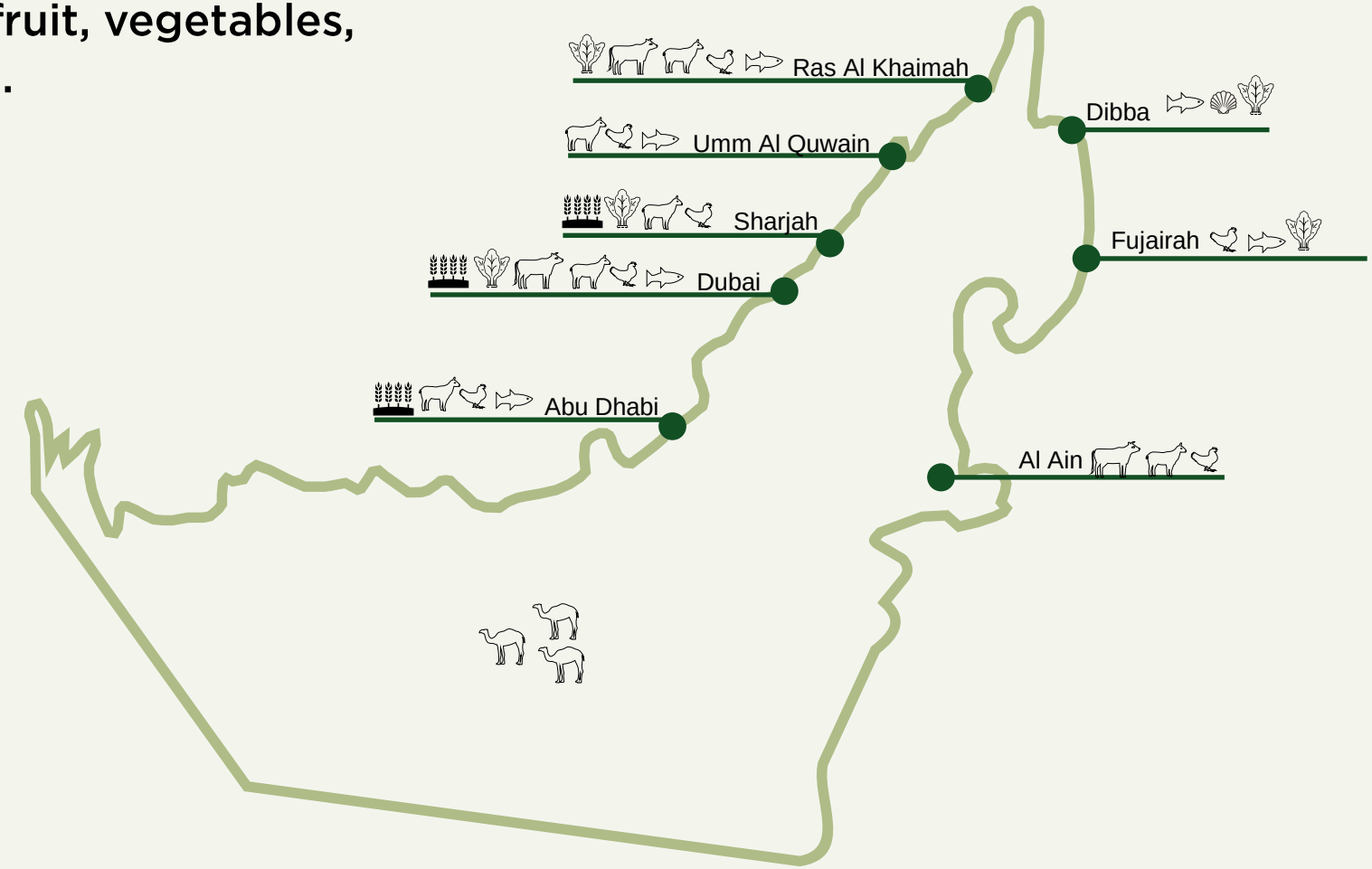
Source: Federal Competitiveness and Statistics Centre, UAE.

THE UAE'S AGRICULTURAL LANDSCAPE IS INCREASINGLY DIVERSE

Agricultural production includes fruit, vegetables, dairy, poultry and fish production.

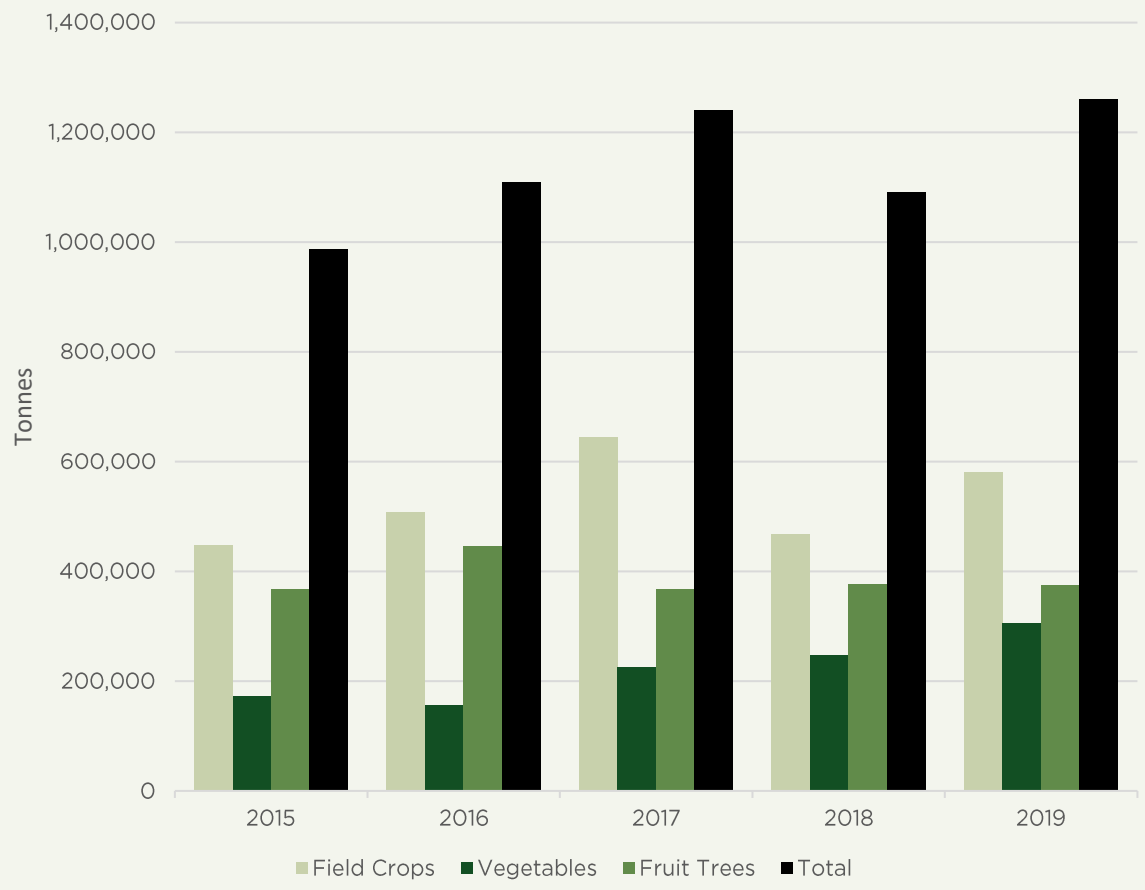
The geographic distribution of production takes into account climatic variations across the country:

- Field crops and vegetables are grown predominately in the northern emirates.
- Milk production is greatest inland at Al Ain where humidity is lower.
- Fish capture occurs off both coasts and intensive fish farming operations are underway in Fujairah, Dibba, Umm Al Quwain and Dubai.

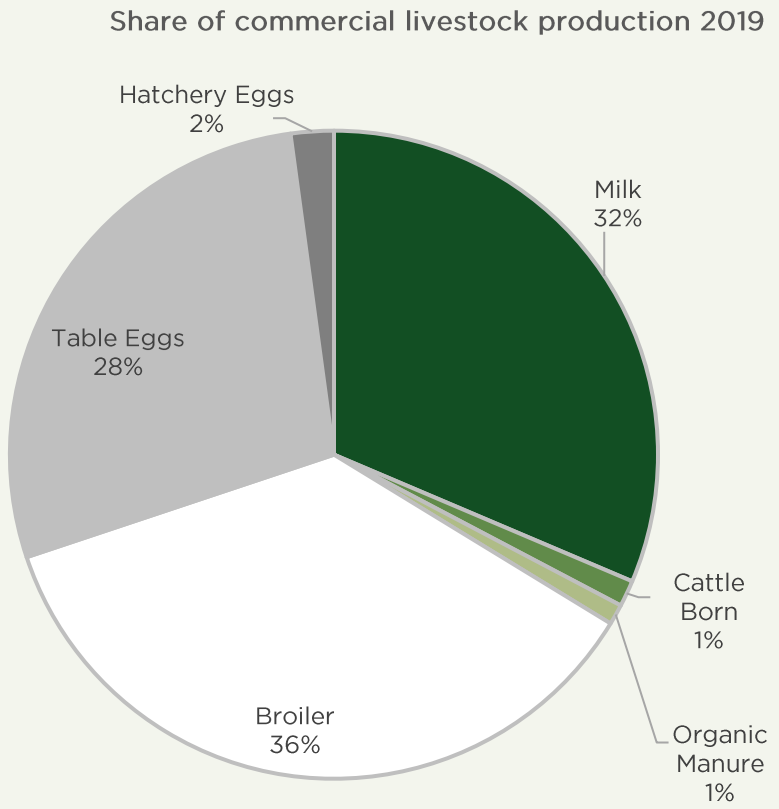


HORTICULTURE AND LIVESTOCK PRODUCTION IN THE UAE

Horticultural Production is on the Rise

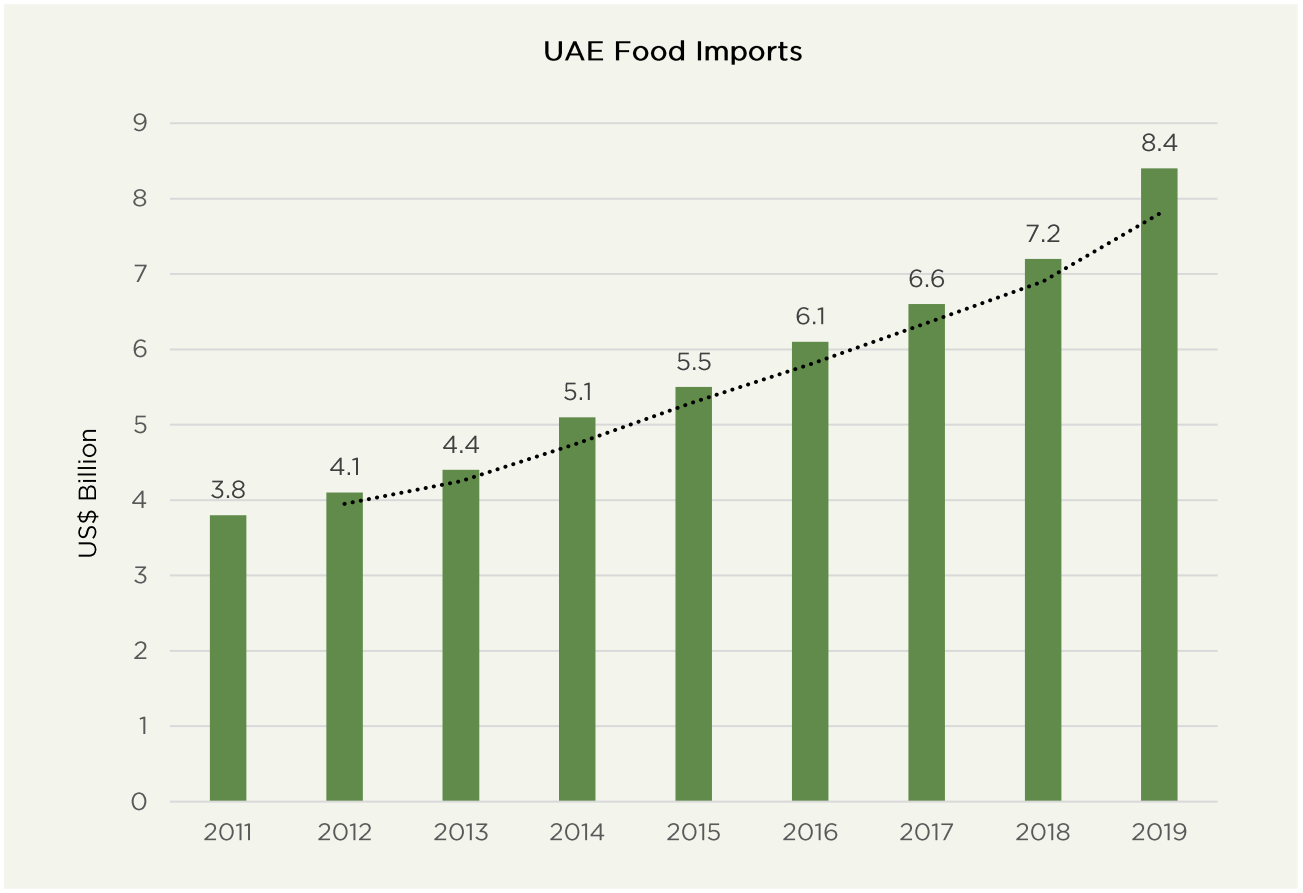


Livestock Production is Focused on Dairy milk, Broiler Meat and Table Eggs



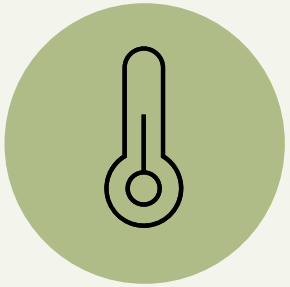
DESPITE INCREASED AGRICULTURAL OUTPUT, FOOD IMPORTS CONTINUE TO RISE

- After remaining relatively stable between 2008 and 2011, the value of food imports has risen steeply to US$8.4 billion in 2020 highlighting the need for renewed focus on improving agricultural production and food security strategies.
- With population growth of 1-2% annually forecast food imports are likely to continue increasing.
- Further investment is therefore required if the UAE is to offset food demand.



Source: Federal Competitiveness and Statistics Centre, UAE

KEY CHALLENGES OFFER OPPORTUNITIES FOR TECHNOLOGY LED INTERVENTIONS TO DISRUPT THE MARKET



Difficult to product food domestically:

- Only 0.5% of the land mass is arable.
- Soil is sandy and requires additives to cultivate produce.
- Extreme heat limits the capacity to cultivate and store produce.

Water Scarcity:

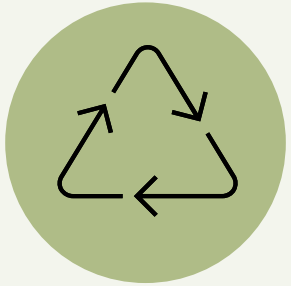
- The country receives very minimal rainfall and is dependent on desalination.
- The cost of water for agricultural production is currently being subsidized and is very costly.
- 66% of all water being used for agriculture.

Dependent on food imports:

- The UAE imports 90% of its food.
- Sensitive to price fluctuations such as in 2008 and 2020.

Growing population:

- The UAE has experienced substantial population growth over the last 30 years.
- UAE population forecast to reach 15 million in the next 20 years.



High levels of food waste throughout the supply chain:

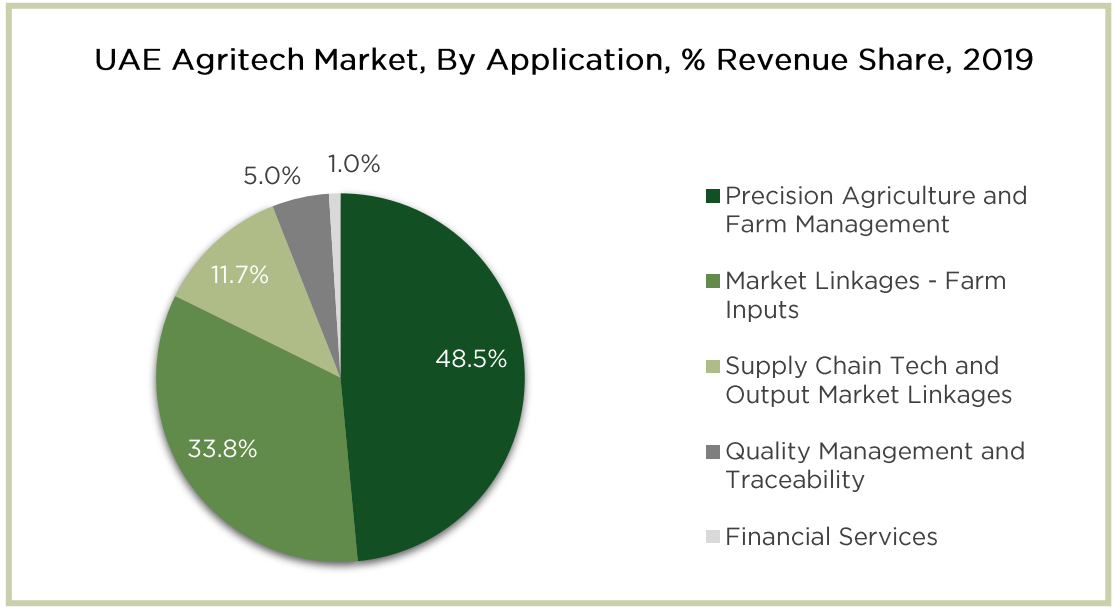
- Inefficient supply chain with gaps at all stages.
- Historic overconsumption.
- Little recycling of organics .

Underdeveloped Agri-education ecosystem:

- Majority of farm workers are foreign workers with little agricultural experience.
- Minimal agricultural extension services.
- No agricultural trade training institution.

AGRITECH IN THE MIDDLE EAST WHERE DO WE STAND?

UAE AGRITECH MARKET BY APPLICATION



- Market share by application is expected to largely remain the same over the next seven years.

A new hydroponic system being installed in a greenhouse at ICBA, Dubai.

A SUPPORTIVE, GOVERNMENT-LED ECOSYSTEM

Vision: To be most food secure nation in the world by 2051

POLICY

Federal Level

- Ministry of Food and Water Security
- Ministry of Climate Change, Agriculture and Environment

Emirate Level

- Abu Dhabi Food Control Authority
- Municipalities

FUNDING

- US$ 1.5 billion has been committed over the next five years for Agritech initiatives
- Agritech loan guarantee and supply chain financing programme
- Abu Dhabi Investment Office (ADIO) established US$ 500 million fund for supporting agritech firms to establish in the emirate (Ghadan 21)

ACTIVITIES

- Abu Dhabi hosts the Global Forum for Innovations in Agriculture, the world's largest showcase of agritech innovation.
- National level genome mapping of livestock and key crops to spur innovation and development.
- Dubai to develop "Food Tech City" a freezone to support development of the agritech and food technology industry.

AGRICULTURE PRODUCTION PRIORITIZED THROUGH THE MINISTRY OF FOOD SECURITY

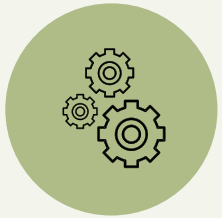
- The mission of the Ministry of Food Security is to provide the UAE's population having access to sufficient, safe and nutritious food for an active and healthy life at affordable prices.
- UAE currently ranks 21st on the Global Food Security Index but has set the target of becoming the world's most food secure nation by 2051.
- Achieving this goal will require concerted effort to:
  - Increase domestic food production.
  - Acquisition or establishment of farms abroad to produce protein and crops not suited to for the country's arid environment.
  - Significant reduction in food waste from farm to plate.
- In 2018 the UAE's Ministry of Climate Change and Environment announced that food waste costs the UAE economy approximately ($3.5bn) annually.

Production efforts are being focused on a redeveloped "Food Basket"

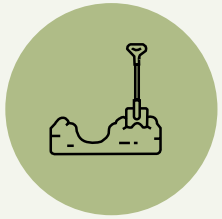
IN RESPONSE THE GOVERNMENT HAS IDENTIFIED EIGHT FOCUS AREAS

Agriculture Waste Mitigation
- Treatment and disposal of organic waste
- Consumer education

Agricultural Biotechnology
- Climate resilient seeds
- Improved genetics
- Micro-organisms

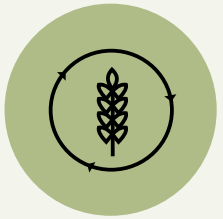


Robotics and Equipment
- High-end manufacturing
- Autonomous cultivation and harvest
- Research and development

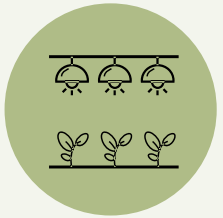


Novel Farming
- Precision agriculture
- Improved irrigation
- Training and education

Ag Supply Chain Technologies
- Supply chain software
- Consolidated procurement
- Food Hubs



Alternative Food
- Lab-grown meats
- Insect and plant-based proteins



Farm IOT
- Sensors
- Farm Management Software

Bio-based Materials
- Recycling of organics
- Bio-diesels

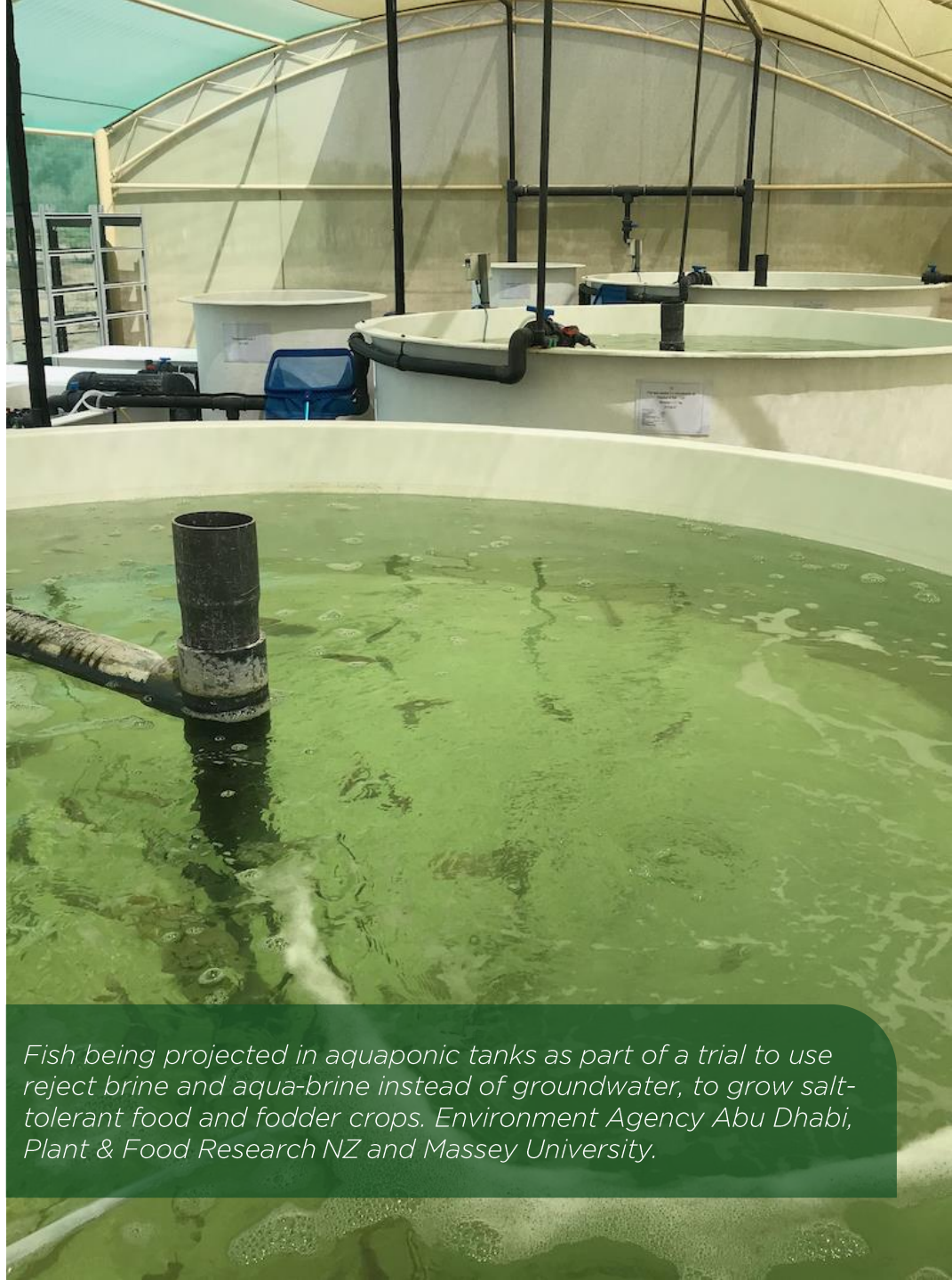
KEY MARKET TRENDS

Use of Controlled Environment Agriculture for production

Vertical farming on the rise

Focus on Aquaculture by UAE government driving new investment

Uptake of precision farming > sensors variable rate applicators



Fish being projected in aquaponic tanks as part of a trial to use reject brine and aqua-brine instead of groundwater, to grow salt-tolerant food and fodder crops. Environment Agency Abu Dhabi, Plant & Food Research NZ and Massey University.

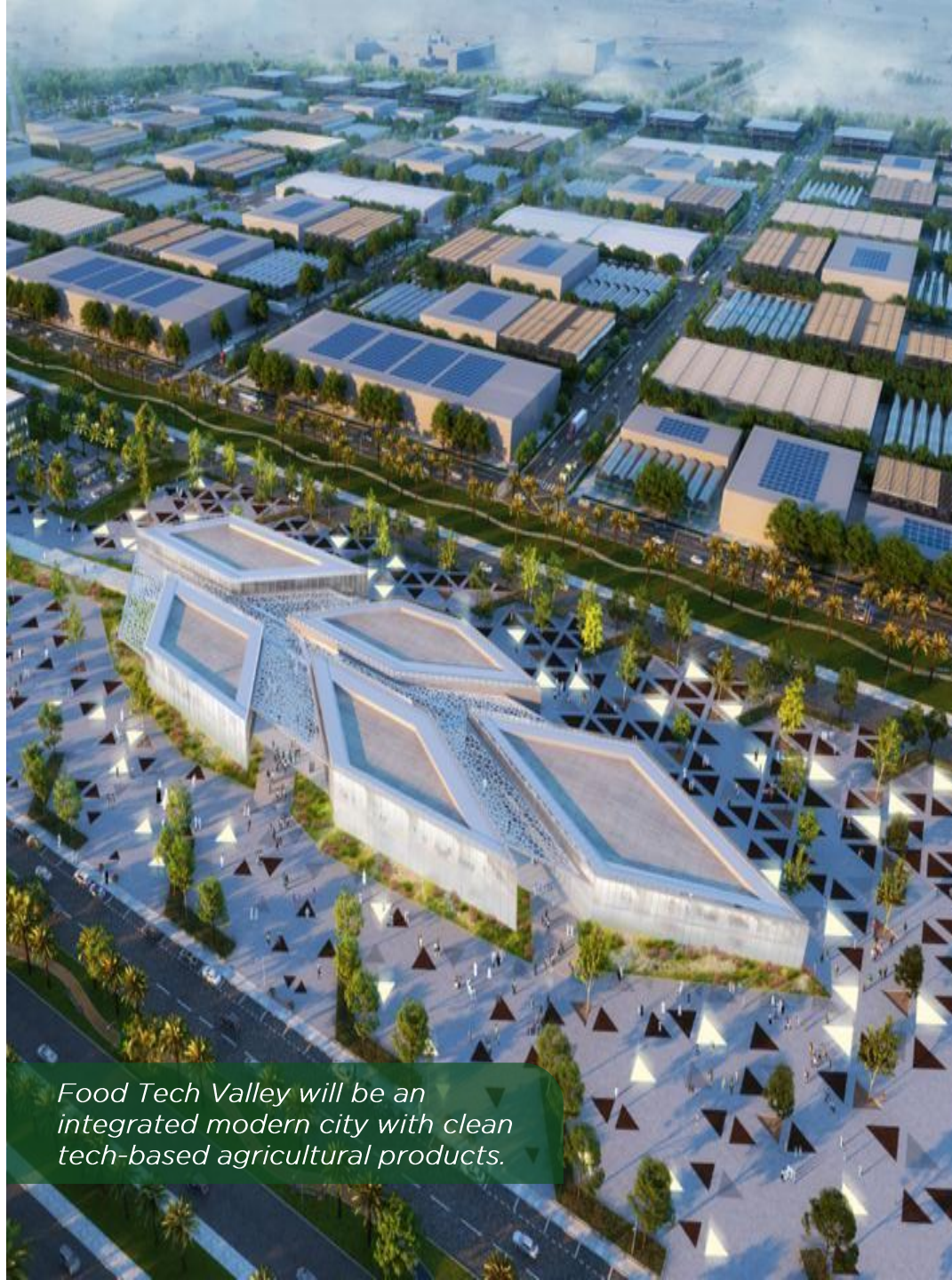
DOMESTIC AGRITECH PRODUCTION IN ITS INFANCY

FOOD TECH VALLEY

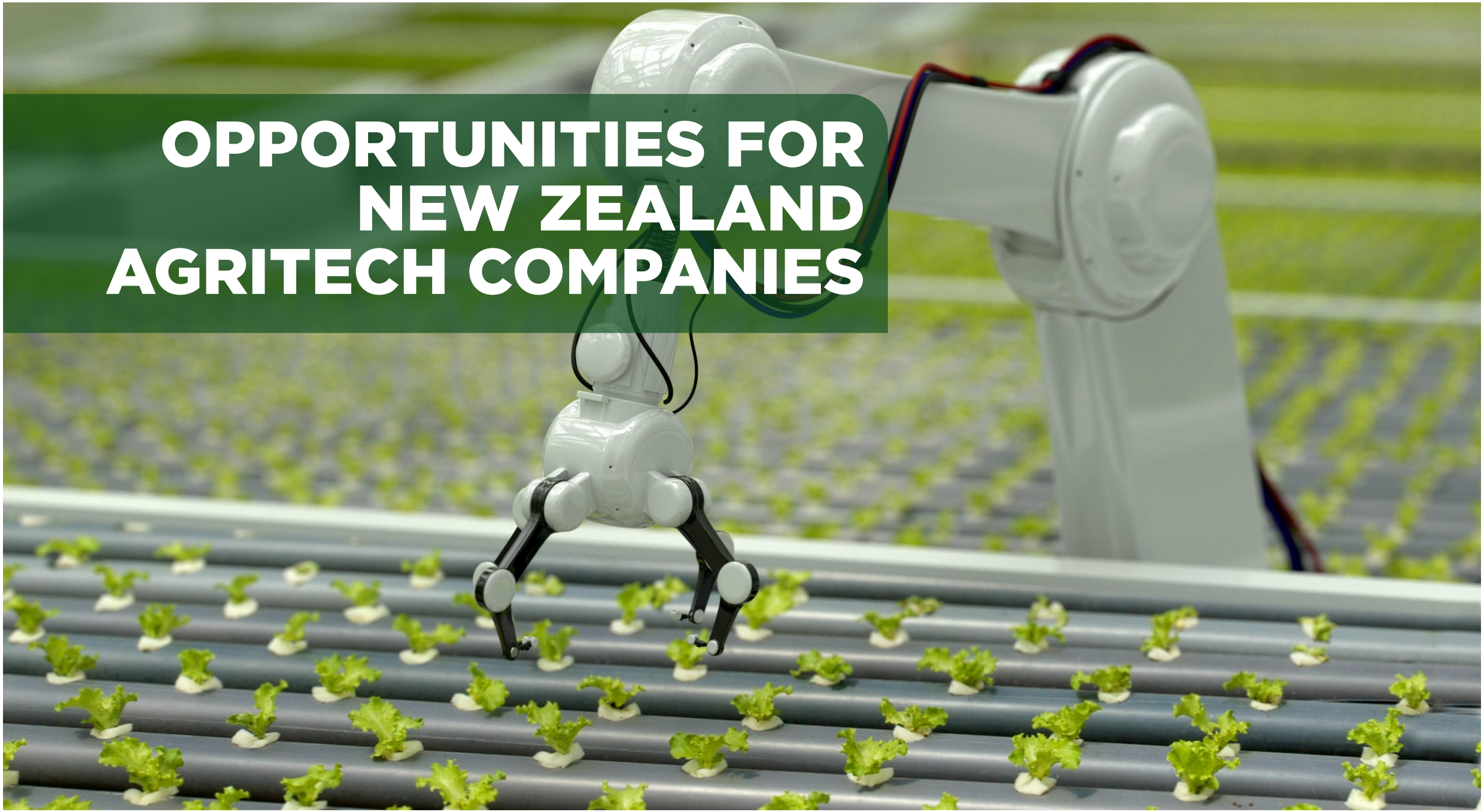
In April 2021, Dubai unveiled plans for an integrated modern city that will serve as a hub for clean tech-based food and agriculture products.

It will be based around four main clusters:

- Agritech and engineering.
- Food innovation center.
- R&D facilities.
- Advanced smart food logistics hub.



Food Tech Valley will be an integrated modern city with clean tech-based agricultural products.

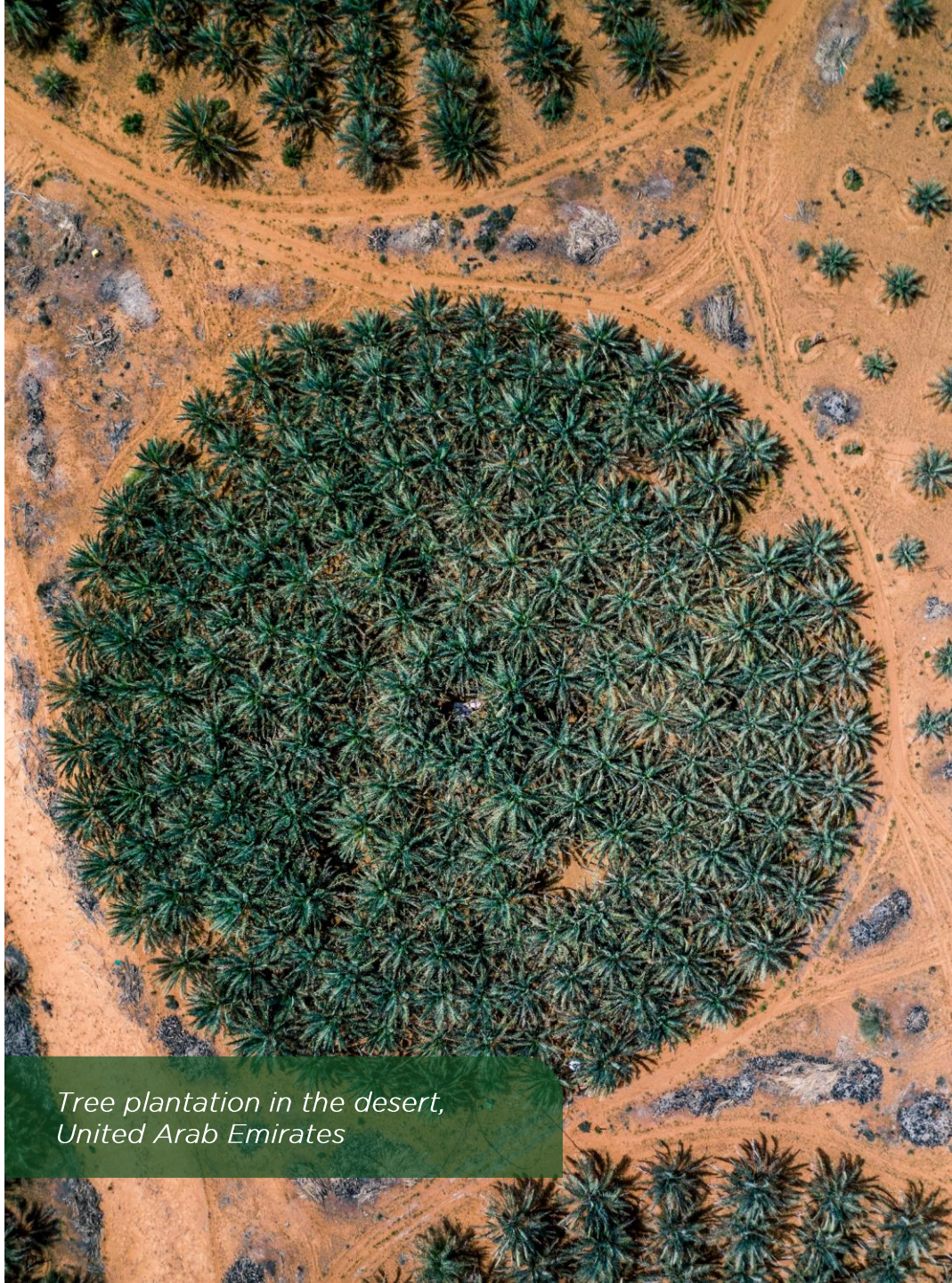


OPPORTUNITIES FOR NEW ZEALAND AGRITECH COMPANIES

WHAT IS THE OPPORTUNITY FOR NEW ZEALAND AGRITECH?

- US$ 51 million (Estimated market size[1]).
- Forecasted to grow at CAGR 15.7% 2019-2027.[2]
- Springboard into the wider GGC market estimated at US$ 170 million.
- Additionally, over US$ 140 million of new investments have been made into CEA (Controlled Environment Agriculture) and US$ 1.5 billion has been committed to agritech over the next five years.

[1]Not including new investments into Controlled Environment Agriculture
[2]GMI Research Report April 2021



Tree plantation in the desert, United Arab Emirates

OPPORTUNITIES AREAS – IDENTIFIED MARKET SEGMENTS

	HORTICULTURE (Open Fields and Green Houses)	FRUIT	LIVESTOCK	AQUACULTURE
Agritech Market Size[1]	~$16 Million[2]	~$20 Million	~$14 Million	~$0.8 Million
Domestic Output (USD)	$537 Million	$664 Million	$470 Million	$25.3 Million
Potential Solutions	• Intelligent crop monitoring • Soil regeneration products including • Robotic crop husbandry and harvesters • Nutrient sensors and variable rate applicators • Smart Irrigation • Direct to market applications • Climate tolerant crops • Efficient climate control • Market place applications • Traceability and quality	• Improved genetics • Smart fruit management • Robotic harvesting • Smart Irrigation • Post harvest management • Grading and sorting • Temperature controlled logistics solutions • Pest and disease control	• Heat tolerant genetics • Smart animal monitoring • Efficient cooling and watering systems • Improved feed additives. • Quality feed supplements • Farm management software • Process automation and animal husbandry • E-Learning and extension	• Precision monitoring of nutrient and temperature levels • Smart Pumps and biofilters • Smart supply chain platforms • Automatic harvesting • Cost effective and efficient feeds • Data management • Movable fish cages

[1]Analysis of revenue rates in each sector x multiplied by the typical annual agritech investment rate.
[2] Does not include new investments into Controlled Environment Agriculture (US$ 250 million last 5 years).

EMERGING OPPORTUNITIES

Supplying high-tech products and biotech into the production wave:

- Vertical farming
- High-value crops
- Aquaculture

Farm inputs to support soil regeneration and crop productivity:

- Precision agriculture
- Improving soil composition

Farm management and training software:

- Improving efficiencies and reducing workforce costs

Research and development:

- US$1.5Bn committed over 5 years to agriculture and agritech focused incubators and research initiatives
- Abu Dhabi Investment Office
- Accelerator Programme

Bader Bin Mubarak, CEO of Fish Farm with Dubai raised salmon. Image: The National

MARKET ENTRY HYPOTHESIS

KEY BUYERS OF AGRITECH IN THE UAE

DISTRIBUTORS	Overseas agritech is imported into the UAE either by **representatives** from the agritech vendor themselves or via **trading companies** specialising in overseas agritech solutions. These distributors will then sell the agritech products to the end users. Distributors take responsibility for the aftersales support however this area is not a priority for most distributors.
COMMERCIAL FARMS	Large commercial farms have the ability to import overseas agritech directly for the manufacturer or will purchase from local distributors. Commercial farms tend to purchase in bulk and require efficient set up, service and support. Commercial farms actively seek out appropriate agritech for their farms and are regularly prospected by new agritech vendors.
INDIVIDUAL FARMERS	Individual farmers are the end-users of agritech and can be divided into two groups and have a high reliance on foreign labour: Older farming households (>49 years old, mainly Arabic speaking, lower digital literacy, lower risk appetite for agritech). Younger farming households (<49 years old, English and Arabic speaking, higher digital literacy, higher risk appetite for agritech).

POTENTIAL BARRIERS AND MITIGATION STRATEGIES

POTENTIAL BARRIERS	MITIGATION STRATEGIES
• New Zealand is not considered an arid agriculture specialist.	• Partnership with established research agencies like ICBA. • Use of demonstration plots.
• New Zealand is geographically far, and customers prefer an in-market presence.	• Selection of quality partners - distributors/agents. • Formation of an association or integrator company for initial market entry.
• New Zealand companies have had limited exposure to the Middle East and the cultural differences.	• Participation in a market awareness programme. • NZTE support to market entry.
• Firms from Ireland and Netherlands have strong market presence. Countries like Israel are actively entering the market.	• Competition between Netherlands and Israel may create opportunities for NZ companies.

NZ COMPETITIVE ADVANTAGE

NZ's Value Proposition when entering the UAE market:

- Reputation for premium, green products
- Advanced research and development capability
- Innovation is market driven
- Reputation as Tier 1 agriculture producer
- Established relationships at the government to government level

Microgreens being grown under UV light at Badia Farms in Al Quoz, Dubai

MARKET ENTRY STRATEGY

DISTRIBUTORS

- Identify distributors with large consumer base
- Ideally focused on narrow segment (eg: irrigation)
- Strong technical support capability
- Can be difficult to exit distribution agreements

INDIVIDUAL FARMS

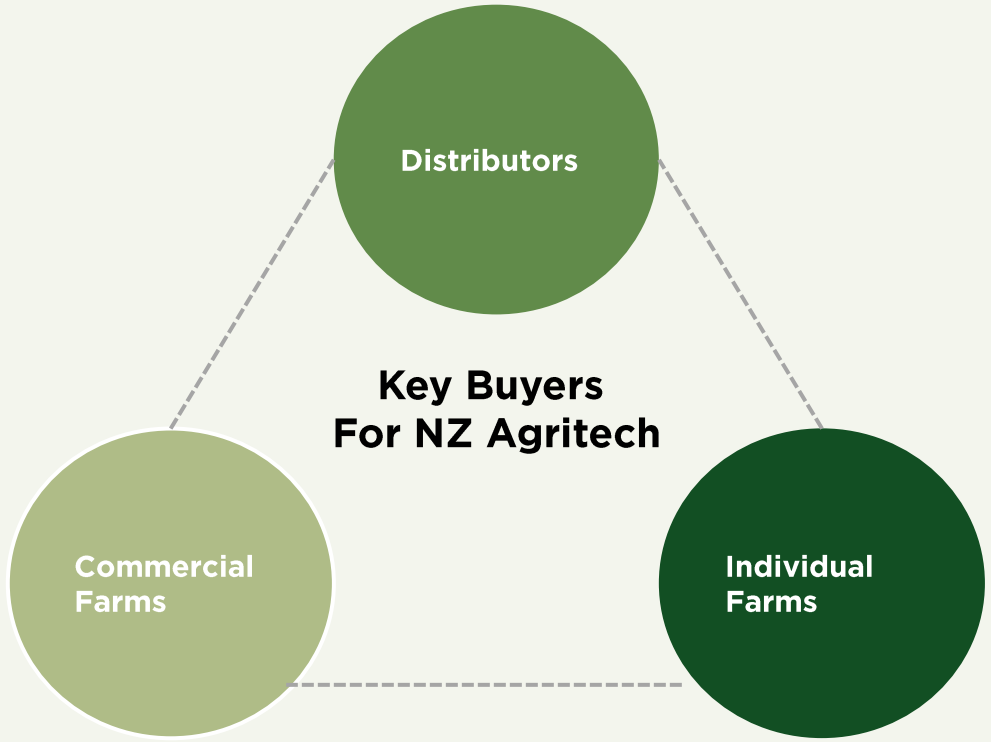
- Needs a company representative to build relationships
- Requirement for quick service support
- Need Arabic speakers
- Small individual sales value but large number of farms

COMMERCIAL FARMS

- Buy in bulk but don't buy often
- Needs a company representative to build relationships
- Requirement for quick service support
- Opportunity to enter with investors at the farm-design stage

STRATEGIC PARTNERSHIPS

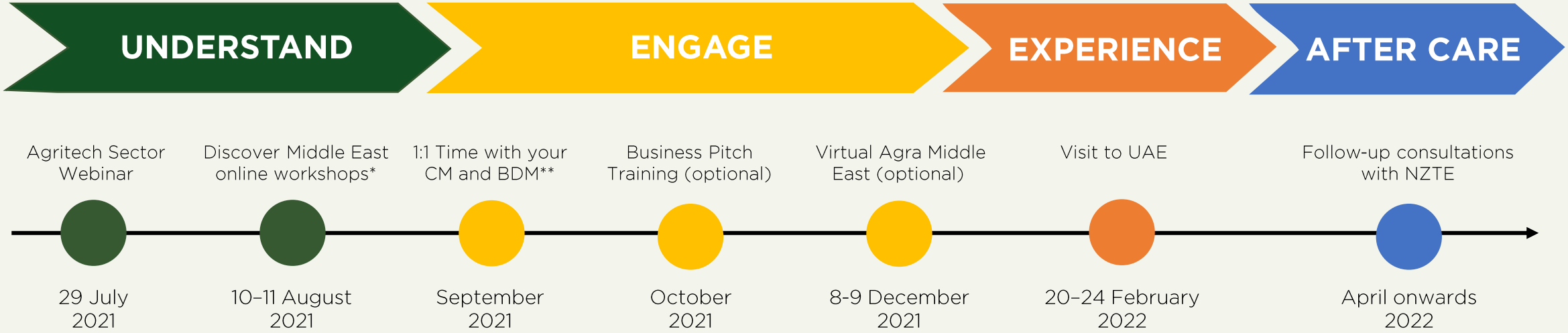
- Strategic partnerships with research organisations such as the International Center for Biosaline Agriculture offer and opportunity to demonstrate capability in an arid environment.
- It is also possible to have the research centre act as a sales agent.
- Research organisations are well connected across the country.



NEXT STEPS

DISCOVER AGRITECH UAE

What to expect from the programme?



* For those unable to join in August, the Discover Middle East Workshops will be repeated in October.
** This 1:1 time will be an opportunity to work closely with your Customer Manager and BDM in-market to build your market strategy.

DISCOVER UAE AGRITECH

MARKET VISIT FROM 20 - 24 February 2022

Day 1

The Agritech sector in the UAE – overview and structure

- UAE regulatory environment
- Building your brand in market
- Presentations from relevant Govt depts

Day 2

Navigating the Agritech Landscape

- Hear from agritech companies
- Visits to relevant farms e.g. AeroFarms, Madar Farms
- Networking function

Day 3

Visit to Food For Future Summit

- Visit this summit, which is part of EXPO's Food, Agriculture and Livelihoods Week.
- Visits to relevant UAE research institutes e.g. International Centre for Biosaline Agriculture

Day 4

1:1 sessions with NZTE Beachhead advisors and BDM's

- Feedback on your proposed in-market strategy and work on next steps

Note - the Discover Agritech programme could include a pop up or trial farm if there is enough interest.